

WHAT IS CLAIMED:

1. An isolated nucleic acid molecule comprising:
a nucleotide sequence consisting of or complementary to all or part of a coding sequence of SEQ ID NO. 15, wherein said part comprises one or more open reading frame selected from the group consisting of ORF1, ORF2, ORF3, ORF4, ORF5, ORF6, ORF7, ORF8, and ORF9; or
a nucleotide sequence encoding a variant of SEQ ID NO. 15 wherein the polypeptide encoded by the nucleotide sequence of the variant has insecticidal activity, and hybridizes to the nucleotide sequence of SEQ ID NO. 15 under high stringency conditions of 0.1xSSC, 0.1%SDS at 65°C.
2. An isolated nucleic acid molecule comprising:
a nucleotide sequence consisting of or complementary to all or part of a coding sequence of SEQ ID NO. 16, wherein said part comprises one or more open reading frame selected from the group consisting of ORF1', ORF2', ORF3', ORF4', ORF5', ORF6', ORF7', and ORF8'; or
a nucleotide sequence encoding a variant of SEQ ID NO. 16 wherein the polypeptide encoded by the nucleotide sequence of the variant has insecticidal activity, and hybridizes to the nucleotide sequence of SEQ ID NO. 16 under high stringency conditions of 0.1xSSC, 0.1%SDS at 65°C.
3. The isolated nucleic acid molecule of claim 2 further comprising:
a nucleotide sequence consisting of or complementary to all or part of a coding sequence of SEQ ID NO. 17, wherein said part of the coding sequence comprises one or more open reading frame selected from the group consisting of ORF1', ORF2', ORF3', ORF4', ORF5', ORF6', ORF7', ORF8', ORF9' and ORF10'; or
a nucleotide sequence encoding a variant of SEQ ID NO. 17 wherein the polypeptide encoded by the nucleotide sequence of the variant has insecticidal activity, and hybridizes to the nucleotide sequence of SEQ ID NO. 17 under high stringency conditions of 0.1xSSC, 0.1%SDS at 65°C.

4. The isolated nucleic acid of claim 1, 2, or 3, wherein the coding sequence encodes an epoxidase.
5. The isolated nucleic acid of claim 1, 2, or 3, wherein the coding sequence encodes an α -type pyridoxal phosphate (PLP)-associated enzyme.
6. The isolated nucleic acid of claim 5, wherein the α -type pyridoxal phosphate (PLP)-associated enzyme is a class-v aminotransferase.
7. The isolated nucleic acid of claim 1, 2, or 3, wherein the coding sequence encodes a cytochrome P450.
8. The isolated nucleic acid of claim 7 wherein the cytochrome P450 is pisatin demethylase.
9. The isolated nucleic acid of claim 1, 2, or 3, wherein the coding sequence encodes an aspartate (Asp) kinase.
10. The isolated nucleic acid of claim 1, 2, or 3, wherein the coding sequence encodes an oxidoreductase.
11. The isolated nucleic acid of claim 10, wherein the oxidoreductase is a nonheme-Fe oxidoreductase.
12. The isolated nucleic acid of claim 11, wherein the nonheme-Fe oxidoreductase is isopenicillin N synthase.
13. The isolated nucleic acid of claim 1, 2, or 3, wherein the coding sequence encodes an ornithine decarboxylase.

14. The isolated nucleic acid of claim 1, 2, or 3, wherein the coding sequence encodes a γ -type pyridoxal phosphate (PLP) enzyme.
15. The isolated nucleic acid of claim 1, 2, or 3, wherein the coding sequence encodes a FAD-containing monooxygenase.
16. The isolated nucleic acid of claim 15, wherein the monooxygenase is a cyclohexanone oxidase.
17. The isolated nucleic acid of claim 1 wherein the open reading frame encodes a non-determined (unknown) enzyme encoded by ORF4.
18. The isolated nucleic acid of claim 2 or 3, wherein the open reading frame encodes a non-determined (unknown) enzyme encoded by ORF4'.
19. The isolated nucleic acid of claim 3, wherein the open reading frame encodes a non-determined (unknown) enzyme encoded by ORF10'.
20. An isolated nucleic acid molecule that comprises an alkaloid gene cluster, said gene cluster comprising three or more open reading frames of claim 1, 2, or 3.
21. An expression vector comprising the nucleic acid compound of claim 1, 2, or 3.
22. A host cell transformed with an expression vector of claims 21.
23. The host cell according to claim 22 wherein the host cell is a bacterium.
24. The host cell according to claim 23 wherein the host cell is *E. coli*.
25. A method of producing alkaloids comprising:
 - (a) introducing the expression vector of claim 21 into a host cell;

- (b) expressing the isolated nucleic acid compound of claim 1, 2, or 3 in said host cell;
- and
- (c) isolating loline alkaloid or variants thereof from said host cell.